High Bioethanol Titre from Manihot Glaziovii through Fed-Batch Simultaneous Saccharification and Fermentation in Automatic Gas Potential Test System

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Abstract
A process for the production of high bioethanol titre was established through fed-batch and simultaneous saccharification and fermentation (FB-SSF) of wild, non-edible cassava Manihot glaziovii. FB-SSF allowed fermentation of up to 390 g/L of starch-derived glucose achieving high bioethanol concentration of up to 190 g/L (24% v/v) with yields of around 94% of the theoretical value. The wild cassava M. glaziovii starch is hydrolysable with a low dosage of amylolytic enzymes (0.1–0.15% v/w, Termamyl® and AMG®). The Automatic Gas Potential Test System (AMPTS) was adapted to yeast ethanol fermentation and demonstrated to be an accurate, reliable and flexible device for studying the kinetics of yeast in SSF and FB-SSF. The bioethanol derived stoichiometrically from the CO2 registered in the AMPTS software correlated positively with samples analysed by HPLC (R2 = 0.99).

Keywords
Manihot glaziovii; Fed-batch; Bioethanol; Automatic Gas Potential Test System; Simultaneous saccharification and fermentation